U.S. Department of Energy
National Nuclear Security Administration

Initial Implementation Assessment
of the
Nevada Site Office
Safety System Oversight Program

Final Report

December 2004

Assessment Team

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EXECUTIVE SUMMARY

Initial implementation of the Safety System Oversight (SSO) function being established at the Nevada Site Office (NSO) was reviewed by two Federal Technical Capability Agents to assess efforts to implement the program using criteria developed by the Federal Technical Capability Panel. The Draft NSO SSO Program Guide describes a process to implement the SSO function which meets the requirements of DOE M 426.1-1A. NSO is in the process of finalizing the Program Guide. The NSO SSO program does meet the following objectives;

1) An effective SSO Program is being established by the Field Element Manager to apply engineering expertise to maintain safety configuration and to assess system condition.

2) SSO personnel and supervisors with responsibilities for SSO personnel are appropriately trained and qualified, or are in the process of achieving qualification.

3) SSO Supervisors effectively perform their SSO program responsibilities.

Currently implementation has not progressed far enough to determine if the NSO SSO program fully meets the objectives of;

1) SSO personnel provide oversight of the Contractors' System Engineer Program

2) SSO personnel are knowledgeable and familiar with assigned safety systems.

Several opportunities for improvement listed below were identified during the review:

1) Revise the Program Guide into a Program Manual implementing the requirements of DOE M 426.1-1A. The manual should also provide more specificity regarding the level of oversight to be performed.

2) Develop a Safety System Oversight Qualification Plan which describes the qualification process for SSO personnel including learning methods, evaluating criteria and identification of qualifying officials.

3) NSO may want to reevaluate what systems are to be included in the program giving consideration to design features or defense-in-depth components, and consider putting the Vital Safety System list under configuration control of the NSO Management Systems Steering Panel.

4) Revise NNSA/NSO M 111.XD Function, Responsibilities and Authority Manual to include the integration of the SSO Program.

Although, initial progress toward the development of the SSO Program is positive, full implementation by the end of CY 2005 may be difficult without additional management attention.

INTRODUCTION

In May 2004, the Department of Energy (DOE) institutionalized the Safety System Oversight (SSO) function to monitor the performance of systems relied upon to assure safe operation of nuclear facilities and evaluate effectiveness of the Contractor's cognizant system engineer program. The SSO function, including roles and responsibilities of personnel assigned this function, are described in DOE M 426.1-1A, *Federal Technical Capability Panel Manual*. DOE M 426.1-1A also defines the knowledge, skills and abilities to be incorporated into technical qualification programs for personnel assigned the SSO function.

The objective of this review is to assess initial actions taken by the Nevada Site Office (NSO) to implement SSO functions. The reporting format described in DOE M 426.1-1A was used to document the review results.

SCOPE and METHODOLOGY

The review was performed by the NSO Federal Technical Capabilities Panel (FTCP) Agent and the FTCP agent from the Livermore Site Office. Criteria and Review Approach Documents (CRADs) developed by the FTCP were used to assess actions initially taken to define and implement the SSO function at NSO. Full implementation at NSO will be assessed by the FTCP before the end of CY 2005. The CRADs are located in Attachment A of this report.

The results of document reviews and interviews are documented in the "Results" section of this report and broken out by the four CRAD functional areas: Program (PGM); Training and Qualification (TQ); Management (MG); and Oversight Performance (OP).

PGM, TQ and MG functional area assessment consisted of document review and management interviews assessing NSO action to implement the SSO functions described in DOE M 426.1-1A. Since the SSO program has not yet been fully implemented, the OP functional area consisted of SSO personnel interviews to confirm understanding of Program Plan requirements and assess actions being taken to provide this oversight.

Documents reviewed:

➢ NNSA/NSO Technical Qualification Program, approved Operating Procedures
➢ NNSA/NSO Program Guide " NSO Safety System Oversight" (in draft)
➢ NNSA/ NSO Safety System Oversight Personnel Qualification Standard, (Not Yet Approved).
➢ NNSA/NSO FY 2005 Employee Performance/Work Plans
➢ NNSA/NSO M 111.XD Function, Responsibilities and Authority Manual

Personnel interviewed:

SSO Personnel Supervisors (3)
➢ Michael Marelli, Acting Assistant Manager for Safety and Security Programs
➢ Kenneth Hoar, Director, Environmental Safety & Health Division
➢ Nolan Bailey, Director, Performance Assurance Division

Safety System Oversight Program Manager
➢ Daniel Rivas

LSO Safety System Oversight Personnel (1)
➢ John Robson

LSO Facility Representative (1)
➢ Timothy Henderson

RESULTS

Program (PGM)

The review performed under this functional area addressed actions taken by the NSO to establish the SSO function and describe its implementation.

The SSO function established at NSO is defined by the NNSA/NSO Safety System Oversight Program Guide (In Draft). The Program Guide represents NSO management's intent to develop and implement a program to oversee the contractor's system engineering program required by DOE Order 420.1A, "Facility Safety". Section 6.0 of the Program Plan describes inclusion of SSO qualifications as part of the Technical Qualification Program. The roles, responsibilities and authorities of personnel assigned SSO responsibilities are described in section 5 of the Program Guide. Roles, responsibilities and functions described in the Program Guide are consistent with, and duplicate, the content of DOE M 426.1-1A.

The NSO has compiled a list of Safety Systems which contains the Safety-Class Systems and Safety-Significant Systems as prescribed in the Nevada Test Site nuclear facilities and operations Document Safety Analyses. The list of Safety Systems identified in the SSO Program Guide is a revision of the Vital Safety Systems list which originated as a commitment made by DOE to the DNFSB, and related to the DNFSB Recommendation 2000-2, Configuration Management Vital Safety Systems. This NSO list is revised annually by the Safety Systems Oversight Program Manager. Each safety system has an assigned contractor Cognizant Systems Engineer (CSE), as well as a federal Safety Systems Oversight Person (SSOP). The CSE ensures the safety systems managed per the requirements established in the Systems Engineer Program and as described in the DOE O 420.1A. The SSOP ensures the Systems Engineer Program is properly implemented by providing oversight as required by the DOE M 426.1-1A.

Only active systems have been identified for inclusion into the SSO Program at this time. NSO may want to reconsider including passive systems (e.g., design features) and/or

defense-in-depth systems due to their importance in the control of identified risks. NSO may also want to consider putting the Vital Safety Systems list under configuration control of its Management System Steering Panel, rather than the SSO Program Manager. This would provide an opportunity for line management to provide input.

NNSA/ NSO Safety System Oversight Program Guide describe NSO processes to qualify SSO candidates and evaluate their level of knowledge. The process requires candidates to complete a separate qualification card developed for each assigned safety system. Level of knowledge regarding qualification card competencies is confirmed by a qualifying official through practical demonstration, written, or oral examinations. This process meets the expectations of DOE M 426.1-1A.

Interviews were conducted to assess understanding of the NSO role. Supervisory expectations were generally consistent with the NSO Program Guide. Expectations are well defined in SSO personnel's performance/work plans, as well as specific measures for the implementation of their SSO responsibilities.

A staffing analysis for SSO personnel is currently being completed by NSO in accordance with FTCP guidance. Draft results of this analysis indicate the SSO program is adequately staffed.

Training and Qualification (TQ)

The review performed under this functional area addressed actions taken to ensure SSO personnel and supervisors with responsibilities for SSO personnel are appropriately trained and qualified. Section 5 of the Program Guide only recommends that supervisors with responsibilities for SSO personnel need to qualify as Senior Technical Safety Managers (STSM). To meet the expectations of DOE M 426.1-1A, supervisors with responsibilities for SSO personnel need to qualify or compensatory measures should be in place.

All assigned NSO SSO personnel have qualified or are in the process of qualifying under the General Technical Base standard and a Functional Area Qualification Standard. NSO SSO personnel have not made any progress in qualifying under the NSO SSO standard. The assigned due date for qualification to the SSO qualification standard is December 2005.

The SSO qualification processes are in accordance with the NNSA/NSO Standard Operating Procedure "Technical Qualification Program" (TQP SOPs). The development of NNSA/NSO Safety System Oversight Personnel Qualification Standards are guided by the NNSA/NSO Safety System Oversight Program Guide. Each standard has four competencies that must be met once for all systems assigned and two practical exercises in which system performance data is gathered in a walk-down of the system, and participation in a performance-base assessment for each system assigned. Demonstration of competency is through oral or written examination or practical demonstration. Although SSOP Qualification Standards have been draft, no plans have been developed to guide the qualification process. Qualifications plans should be prepared and should include learning methods, evaluating criteria, and identification of qualifying officials.

Management (MG)

The review performed under this functional area assessed actions being taken to ensure SSO supervisors effectively perform their responsibilities. The process used to maintain configuration of the list of vital safety systems (discussed above) ensures that the systems are consistent with those credited in the DSAs. Although this process is described in Appendix A of the Program Guide, responsibility for this requirement has not been assigned in Section 5.0, Duties and Responsibilities. As part of this list, personnel assigned SSO responsibilities for the individual systems. Personnel are notified by the SSO Program Manager of any changes in their assignment due to changes in the list. They are then notified of any changes in their qualification requirements through the process identified in the TQP SOPs. Tracking progress of personnel towards meeting their qualification requirements has not been assigned in the Program Guide. Participants in the SSO Program have not been added to the NSO TQP database. Interviews indicated some supervisors discuss progress with individual employees on a regular basis.

Interviews conducted generally indicated roles and responsibilities of SSO personnel and their supervisors were well understood. Review of NSO M 111.XD Functions, Responsibilities, and Authority Manual indicates that a revision is necessary to address the SSO program.

Oversight Performance (OP)

The CRADS used for this functional area addressed actions taken to oversee the Contractor's cognizant system engineer program and to ensure SSO personnel are knowledgeable and familiar with assigned safety systems. Interviews were performed to confirm program understanding, ownership and implementation by personnel assigned SSO responsibilities.

The Nevada Site Office Systems Engineer Program is in its infancy. NSO oversight of the Contractor's program is not yet adequately formalized. NSO oversight of the Contractor's SSO program has been limited to operational readiness reviews of nuclear facilities and DNFSB 2000-2 Phase II Assessments.

The SSO Program Manager has met with all SSO personnel to review the draft Program Guide and discuss their roles and responsibilities. SSO personnel have started to meet with the Contractor's systems engineers for their assigned systems. Some SSO personnel have been performing oversight of their assigned systems as part of the Functional Area Manager duties, e.g., the SSO person for the DAF Fire Suppression Systems is also the Functional Area Manager for Fire Protection.

An interview with a Facility Representative indicated that interactions between Facility Representatives and SSO personnel are beginning to occur. At this point of the implementation of the SSO program, there are no routine meetings between SSO personnel and Facility Representatives.

Expectations regarding the level of oversight are not yet well defined. The SSO Program Guide requires SSO personnel to perform periodic assessments, but no further definition of the frequency of these assessments (or other oversight functions) is given. NSO uses a Master Assessment Schedule to define the expectations of the level of oversight to be performed by staff.
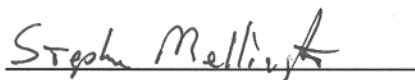
CONCLUSIONS and RECOMMENDATIONS

The NSO Program Guide describes a process to implement the SSO function which meets the requirements of DOE M 426.1-1A. NSO is just beginning the implementation of the Program Guide. The NSO SSO program will meet the objectives of the Program, Training and Qualification, and Management CRADs when it is fully implemented. Currently implementation has not progressed far enough to determine if the NSO SSO program will meet the two Objectives in the Oversight Performance CRADs. Several opportunities for improvement listed below were identified during the review:
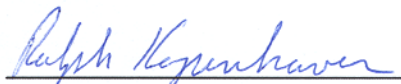
1) Revise the Program Guide into a Program Manual implementing the requirements of DOE M 426.1-1A. The manual should also provide more specificity regarding the level of oversight to be performed.

2) Develop a Safety System Oversight Qualification Plan which describes the qualification process for SSO personnel including learning methods, evaluating criteria and identification of qualifying officials.

3) NSO may want to reevaluate what systems are to be included in the program giving consideration to design features or defense-in-depth components, and consider putting the Vital Safety System list under configuration control of the NSO Management Systems Steering Panel.

Although, initial progress toward the development of the SSO Program is positive, full implementation by the end of CY 2005 may be difficult without additional management attention.

ATTACHMENT: Safety System Oversight (SSO) Program Implementation Assessment Criteria Review and Approach Documents (CRADs)

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Attachment A

**Criteria and Review Approach Documents
(CRADs)**

Safety System Oversight (SSO) Program
Implementation Assessment
Criteria and Review Approach Documents (CRADs)

Revision 0

PROGRAM (PGM)

OBJECTIVE

PGM.1 An effective SSO Program is established by the Field Element Manager to apply engineering expertise to maintain safety system configuration and to assess system condition and effectiveness of safety management program implementation.

Criteria

PGM.1.1 The SSO Qualification Program is part of the Technical Qualification Program (DOE M 426.1-1A, Chapter III, Section 1, 2.b (1)).

PGM.1.2 The SSO Program establishes appropriate training, qualification, and performance requirements for SSO personnel and the supervisors are held accountable for achieving them (DOE M 426.1-1A, Chapter III, Section 1, 2.b (2)).

PGM.1.3 The safety systems and safety management programs included in the SSO Program align with those systems and programs identified in the applicable Documented Safety Analysis (DOE M 426.1-1A, Chapter III, Section 1, 4.c).

PGM.1.4 Safety system oversight requirements are defined and implemented, for example, functions, responsibilities, and authorities of personnel assigned to perform safety system oversight and their interface/support of Facility Representatives are clearly defined, and SSO staffing needs are identified and there is a plan or process to ensure future staffing needs are met and maintained (DOE M 426.1-1A, Chapter III, Section 1, 2.b (3) & (4)).

PGM.1.5 Affected DOE and contractor managers understand the SSO role and relationship to Facility Representatives and the contractor's cognizant System Engineers, and provide the necessary access and support (DOE M 426.1-1A, Chapter III, Section 1, 3.d).

PGM.1.6 Qualifying Officials are assigned to sign site-specific Qualification Cards (DOE M 426.1-1A, Chapter III, Section 1, 2.b (6)).

PGM.1.7 The SSO Program contains features to verify that SSO candidates possess the required level of knowledge and/or skills to perform assessments and investigations to confirm performance of safety systems in meeting

established safety and mission requirements (DOE M 426.1-1A, Chapter III, Section 1, 2.b (5)).

Approach

Record Review: Review documentation (e.g., site technical qualification program documents, SSO Program Plan, SSO Program procedures, qualification cards and/or standards, internal memorandums, Documented Safety Analyses, etc.) which establish the SSO Program and describe its implementation to determine that the program is complete and comprehensive.

Interviews: Interview management personnel with responsibilities for implementing and executing the SSO program to determine if they are familiar with the role of SSO personnel relative to the Facility Representatives and the contractor's cognizant system engineers, if they provide adequate resources for training, qualification, future staffing, and performance of SSO personnel, and if they appropriately qualified to perform their assigned role in the SSO program. Interview qualifying officials to determine if they are familiar with their role and responsibility, they are currently qualified, and they are performing their assigned role.

Field Observation: Evaluate any process used by or directed by the Field Element Manager to determine the effectiveness of SSO Program Performance.

TRAINING AND QUALIFICATION (TQ)

OBJECTIVE

TQ.1 SSO personnel and supervisors with responsibilities for SSO personnel are appropriately trained and qualified, or are in the process of achieving qualification.

Criteria

TQ.1.1   Supervisors with responsibilities for SSO personnel maintain Senior Technical Safety Manager (STSM) qualification (DOE M 426.1-1A, Chapter III, Section 1, 2.c (1)).

TQ.1.2   Site-specific qualification standards and cards have been developed and a documented process is implemented to assure that SSO candidates meet, at a minimum, the SSO knowledge, skills, and abilities specified in the *Federal Technical Capability Manual* DDOE 426.1-1A, Chapter III, Section 1, 5.a & 5.b)

TQ.1.3   All SSO personnel have completed or are completing the General Technical Base Qualification Standard (DOE-STD-1146-2001) and one or more Functional Area Qualification Standard(s) in a technical area linked to their individual job descriptions (DOE M 426.1-1A, Chapter III, Section 1, 4.a).

TQ.1.4   All SSO personnel have completed or are completing the site-specific qualification standard associated with assigned safety systems (DOE M 426.1-1A, Chapter III, Section 1, 4.a).

TQ.1.5   SSO Supervisors have established methods to assign initial qualification dates, track progress toward qualification, and ensure retraining/requalification occurs as required for each SSO candidate in the qualification process (DOE M 426.1-1A, Chapter III, Section 1, 2.c (4) through (6)).

Approach

Record Review: Review qualification records to establish that supervisors and managers of SSO are qualified as an STSM and those SSO personnel are trained and qualified. Review qualification and requalification schedules, staffing plans, training plans, travel funding, etc., to determine that sufficient resources are provided for training, retraining, qualifying, and requalifying SSO personnel.

Interviews: Interview supervisors, training coordinators, SSO personnel, and budget personnel to establish that training and qualification plans and schedules are being executed as planned and that sufficient resources are provided to meet the schedules.

Field Observation: Observe activities associated with the qualification process, such as qualification boards, exams, walk throughs to determine that the training and qualification process is implemented and functioning effectively.

MANAGEMENT (MG)

<u>OBJECTIVE</u>

MG.1 SSO Supervisors effectively perform their SSO program responsibilities.

<u>Criteria</u>

MG.1.1   Site-specific SSO qualification standards and cards are developed (DOE M 426.1-1A, Chapter III, Section 1, 2.c (2)).

MG.1.2   Supervisors have identified and approved SSO candidate selection (DOE M 426.1-1A, Chapter III, Section 1, 2.c (3)).

MG.1.3   Supervisors of SSO personnel have established SSO personnel qualification schedules and are tracking progress (DOE M 426.1-1A, Chapter III, Section 1, 2.c (4)).

MG.1.4   Supervisors facilitate SSO qualification (e.g., ensure sufficient time and training is provided to complete qualification tasks) (DOE M 426.1-1A, Chapter III, Section 1, 2.c (5)).

MG.1.5   Supervisors ensure SSO personnel are trained and qualified to perform assigned duties (DOE M 426.1-1A, Chapter III, Section 1, 2.c (6)).

MG.1.6   SSO responsibilities are included and measured in Individual Performance Plans (DOE M 426.1-1A, Chapter III, Section 1, 2.c (7)).

MG.1.7   Ensure SSO qualifications are maintained current by training and assignments planned in Individual Development Plans (DOE M 426.1-1A, Chapter III, Section 1, 2.c (8)).

MG.1.8   SSO Supervisors periodically evaluate program effectiveness and implement corrective actions in a timely manner (DOE M 426.1-1A, Chapter III, Section 1, 2.c (9)).

<u>Approach</u>

Record Review: Review qualification cards, Individual Performance Plans, and other SSO program documents and procedures to establish that managers and supervisors are effectively performing their responsibilities as defined in the SSO program. Review other documentation used by supervisors to establish SSO program effectiveness and implementation of corrective actions.

Interviews: Interview supervisors and managers to establish that they are familiar with their assigned roles, they perform their assigned duties, monitor the effectiveness of the SSO program and ensure any identified corrective actions are implemented.

Field Observation: Observe any activities associated with SSO program effectiveness evaluations and/or corrective action implementation.

OVERSIGHT PERFORMANCE (OP)

OBJECTIVE

OP.1 Collectively, SSO personnel provide oversight of the Contractors' System Engineer Program.

Criteria

OP.1.1   Oversight performed by SSO personnel establishes that the contractor System Engineer Program is effectively implemented with goals, objectives, and performance measures (DOE M 426.1-1A, Chapter III, Section 1, 2.a (1)).

OP.1.2   SSO personnel maintain communication with the contractor's cognizant System Engineer (DOE M 426.1-1A, Chapter III, Section 1, 2.a (1)).

OP.1.3   SSO personnel monitor performance of the contractor's cognizant System Engineer Program (DOE M 426.1-1A, Chapter III, Section 1, 2.a (1)).

OP.1.4   SSO personnel attend selected contractor meetings with Facility Representatives and contractor personnel responsible for system performance (e.g., cognizant System Engineers, design authorities, and program managers) (DOE M 426.1-1A, Chapter III, Section 1, 2.a (3)).

Approach

Record Review: Review oversight documentation, such as SSO assessment reports, SSO walk throughs, correspondence, SSO activity records or logs, corrective action documents, etc., to establish that SSO personnel are overseeing implementation and execution of the contractor system engineer program. Review the contractor's system engineer program to determine whether there are any program weaknesses or deficiencies that have not been identified by SSO personnel.

Interviews: Interview SSO personnel, Facility Representatives, and contractor system engineers to establish the level of interface between SSO personnel and the contractor's cognizant system engineers.

Field Observation: Observe any oversight activities of the contractor's system engineer program performed by SSO personnel.

OBJECTIVE

OP.2 SSO personnel are knowledgeable and familiar with assigned safety systems and/or programs.

Criteria

OP.2.1 A qualified SSO is, in fact, knowledgeable of the system status, performance, maintenance, operations, design, and vulnerabilities of their assigned systems or programs. This is evidenced by:

OP.2.1.1 SSO personnel regularly and routinely review periodic system health/status reports (DOE M 426.1-1A, Chapter III, Section 1, 2.a (2)).

OP.2.1.2 SSO personnel review test results, investigation reports, root cause analyses, etc (DOE M 426.1-1A, Chapter III, Section 1, 2.a (2)).

OP.2.1.3 SSO personnel interface with external organizations that can provide insights on performance (DOE M 426.1-1A, Chapter III, Section 1, 2.a (2)).

OP.2.1.4 SSO personnel perform assessments, periodic evaluations of equipment configuration and material condition and safety management program implementation (DOE M 426.1-1A, Chapter III, Section 1, 2.a (3)).

OP.2.1.5 SSO personnel evaluate the effects of aging on system equipment and components, the adequacy of work control and change control processes, and consider the appropriateness of system maintenance and surveillance activities with respect to reliable performance of safety function(s) (DOE M 426.1-1A, Chapter III, Section 1, 2.a (3)).

OP.2.1.6 SSO personnel identify technical issues and participate actively in the resolution of the issues.

OP.2.2 Safety systems and safety management programs have established goals, objectives, and performance measures

OP.2.3 SSO personnel perform evaluations of contractor troubleshooting, investigations, root cause evaluations, and selection and implementation of corrective actions, in conjunction with Facility Representatives (DOE M 426.1-1A, Chapter III, Section 1, 2.a (4)).

OP.2.4 SSO personnel provide support to other Federal employees, as appropriate. (DOE M 426.1-1A, Chapter III, Section 1, 2.a (5))

OP.2.5 SSO personnel assess contractor compliance with relevant DOE regulations, industry standards, contract requirements, safety basis requirements, and other system requirements (DOE M 426.1-1A, Chapter III, Section 1, 2.a (6)).

OP.2.6   SSO personnel confirm configuration documentation, procedures, and other sources of controlling information are current and accurate (DOE M 426.1-1A, Chapter III, Section 1, 2.a (7)).

OP.2.7   SSO personnel report potential or emergent hazards immediately to DOE line management and Facility Representatives (DOE M 426.1-1A, Chapter III, Section 1, 2.a (8)).

OP.2.8   SSO personnel stop tasks, if required, to prevent imminent impact to the health and safety of workers and the public, to protect the environment, or to protect the facility and equipment and immediately notify the on-duty or on-call Facility Representative (DOE M 426.1-1A, Chapter III, Section 1, 2.a (8)).

OP.2.9   SSO personnel serve, when assigned, as qualifying officials in the development or revision of Functional Area Qualification Standards, mentor assigned backups, and qualify other candidates to the Functional Area Qualifications Standards needed to achieve Safety System oversight qualification (DOE M 426.1-1A, Chapter III, Section 1, 2.a (9)).

OP.2.10   SSO personnel maintain cognizance of the appropriate funding and resources to maintain and improve safety systems (DOE M 426.1-1A, Chapter III, Section 1, 2.a (10)).

OP.2.11   Methods have been established for SSO personnel to routinely communicate system/program performance information and issues with STSMs and the Field Office Manager (DOE M 426.1-1A, Chapter III, Section 1, 2.a (1)).

Approach

Record Review: Review oversight documentation, such as SSO assessment reports, SSO walk throughs, correspondence, SSO activity records or logs, corrective action documents, etc., to establish that SSO personnel are performing required oversight. Review contract requirements and their flow down through the contract to the safety systems and safety management programs to establish the effectiveness of SSO personnel oversight that the contractor complies with all requirements relative to safety systems and programs. Review a sample of the safety system health reports, safety system test reports, safety system investigation reports, safety system root cause analyses, etc., to determine the effectiveness of SSO personnel knowledge and familiarity with this information.

Interviews: Interview SSO personnel to determine their knowledge of and familiarity with assigned safety systems and safety management programs, and the reports that the contractor may generate in relation to the systems and programs.

Field Observation: Observe SSO personnel walk downs and other activities in the field to establish the level of SSO personnel knowledge and familiarity of safety systems.